Exhibit C

"Stephen Jay Gould is one of the most brilliant of our ng biologists, gifted, among other things, with the ability wri e. These essays, on a fascinating variety of topics in ural history, are original, informative, enlightening, and nut ing. The fortunate reader will relish them."
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Department of Palaeontology
British Museum

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Author of *The Dragons of Eden*

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Ever Since Darwin

REFLECTIONS IN NATURAL HISTORY

STEPHEN JAY GOULD

theory of the earth's antiquity. One hundred fifty years after that, they unleashed a pompous, three-time loser against John Scopes. Today, using the liberal rhetoric of equal time, they are trying to drive evolutionary theory from the nation's textbooks.

Science, to be sure, has transgressed as well. We have persecuted dissenters, resorted to catechism, and tried to extend our authority to a moral sphere where it has no force. Yet without a commitment to science and rationality in its proper domain, there can be no solution to the problems that engulf us. Still, the Yahoos never rest.

18 | Uniformity and Catastrophe

THE GIDEON SOCIETY —those purveyors of spiritual comfort to a mobile nation—persist in recording the date of creation as 4,004 B.C. in their marginal annotation to Genesis 1. Geologists believe that our planet is at least a million times more ancient—some 4 1/2 billion years old.

Each of the major sciences has contributed an essential ingredient to our long retreat from an initial belief in our own cosmic importance. Astronomy defined our home as a small planet tucked away in one corner of an average galaxy among millions; biology took away our status as paragons created in the image of God; geology gave us the immensity of time and taught us how little of it our own species has occupied.

In 1975, we celebrated the centenary of the death of Charles Lyell, conventional hero of the geologic revolution —"the mirror of all that really mattered in geologic thought," according to one recent biographer. The standard account of Lyell's accomplishment runs in the following way: in the early nineteenth century, geology was dominated by the catastrophists—theological apologists who sought to compress the geologic record into the strictures of biblical chronology. To do this, they imagined a profound discordance between past and present modes of change. The present may run slowly and gradually as waves and rivers do their work; the events of the past were abrupt and cataclysmic

and aggressive urges may have evolved by the Darwinian route of individual advantage, but our altruistic tendencies need not represent a unique overlay imposed by the demands of civilization. These tendencies may have arisen by the same Darwinian route via kin selection. Basic human kindness may be as "animal" as human nastiness.

But here I stop—short of any deterministic speculation that attributes *specific* behaviors to the possession of specific altruist or opportunist genes. Our genetic makeup permits a wide range of behaviors—from Ebenezer Scrooge before to Ebenezer Scrooge after. I do not believe that the miser hoards through opportunist genes or that the philanthropist gives because nature endowed him with more than the normal complement of altruist genes. Upbringing, culture, class, status, and all the intangibles that we call "free will," determine how we restrict our behaviors from the wide spectrum —extreme altruism to extreme selfishness—that our genes permit.

As an example of deterministic speculations based on altruism and kin selection, E.O. Wilson has proposed a genetic explanation of homosexuality (*New York Times Magazine,* October 12, 1975). Since exclusive homosexuals do not bear children, how could a homosexuality gene ever be selected in a Darwinian world? Suppose that our ancestors organized socially as small, competing groups of very close kin. Some groups contained only heterosexual members. Others included homosexuals who functioned as "helpers" in hunting or child rearing: they bore no children but they helped kin to raise their close genetic relatives. If groups with homosexual helpers prevailed in competition over exclusively heterosexual groups, then homosexuality genes would have been maintained by kin selection. There is nothing illogical in this proposal, but it has no facts going for it either. We have identified no homosexuality gene, and we know nothing relevant to this hypothesis about the social organization of our ancestors.

Wilson's intent is admirable; he attempts to affirm the intrinsic dignity of a common and much maligned sexual behavior by arguing that it is natural for some people—and

adaptive to boot (at least under an ancestral form of social organization). But the strategy is a dangerous one, for it backfires if the genetic speculation is wrong. If you defend a behavior by arguing that people are programmed directly for it, then how do you continue to defend it if your speculation is wrong, for the behavior then becomes unnatural and worthy of condemnation. Better to stick resolutely to a philosophical position on human liberty: what free adults do with each other in their own private lives is their business alone. It need not be vindicated—and must not be condemned—by genetic speculation.

Although I worry long and hard about the deterministic uses of kin selection, I applaud the insight it offers for my favored theme of biological potentiality. For it extends the realm of genetic potential even further by including the capacity for kindness, once viewed as intrinsically unique to human culture. Sigmund Freud argued that the history of our greatest scientific insights has reflected, ironically, a continuous retreat of our species from center stage in the cosmos. Before Copernicus and Newton, we thought we lived at the hub of the universe. Before Darwin, we thought that a benevolent God had created us. Before Freud, we imagined ourselves as rational creatures (surely one of the least modest statements in intellectual history). If kin selection marks another stage in this retreat, it will serve us well by nudging our thinking away from domination and toward a perception of respect and unity with other animals.